

Water Withdrawals and Use in Illinois, 2012

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Abstract

This fact sheet summarizes data collected by the Illinois Water Inventory Program for the water reporting year 2012. Water use data is presented in two sectors, public water supply and the self-supplied industry.

During 2012, reported water withdrawals in Illinois totaled 40,230 million gallons per day (mgd), with groundwater totaling 480 mgd and surface water 39,750 mgd. Public water supplies (PWS) withdrew 1,509 mgd and self-supplied industries (SSI) withdrew 38,721 mgd. Electric power generation is the state's number one water user, making up a majority of water withdrawals in 2012. Excluding power generation, which is generally a non-consumptive use of water, SSI withdrawals totaled 477 mgd.

Purpose and Scope

The Illinois Water Inventory Program (IWIP) was founded in 1979 to quantify our state's diverse array of water use and quantity information. The priority of the program has been to develop and maintain a database of high-capacity water wells and intakes from both community water supplies and self-supplied industrial facilities. A high capacity well is any well that is rated to pump greater than 70 gallons per minute (gpm), or about 100,000 gallons per day. The program has collected water use data through an annual questionnaire. The long-term goals of the program include accounting for all major uses of water in Illinois.

Water supply planning in Illinois is dependent on a program like IWIP to collect basic water withdrawal information. The data collected are fundamental to answering questions about water use in the state and are essential for educated estimations of future water demands in Illinois. The program's initiatives were reinforced when an amendment to the Water Use Act of 1983 (Illinois Public Act 096-0222) made the submission of public and self-supplied industrial and commercial withdrawals to IWIP mandatory beginning in 2010. The amendment also made irrigation reporting mandatory beginning in 2015. This was in part due to the critical value of IWIP data for use by state agencies and other professionals in resource-related research and studies involving water withdrawal, water use, and water returns. These data are also provided to and included in the U.S. Geological Survey's 5-year national water use estimates publication series.

This fact sheet focuses on providing an overview of water withdrawals by public water supplies and self-supplied industrial facilities in Illinois during 2012. Estimates for non-community public water systems, rural water use, agricultural irrigation, domestic use, and livestock use are not included.

Previous Studies

The Illinois State Water Survey (ISWS) has been involved in evaluating water resources in Illinois since the early 1940s; however, IWIP did not begin collecting and summarizing data until 1979. Previous publications, which mainly focused on water withdrawals by region or by major user category, can be found in electronic format in the publications section of the ISWS website: <http://www.isws.illinois.edu/pubs/isearch.asp>

Present Study

Currently, the IWIP database contains site-specific information for over 11,900 active, and inactive high-capacity withdrawal point sources from over 4,700 facilities throughout Illinois. The database contains public water supply wells and surface water intakes for communities, high-capacity private wells and surface water intakes for industry, commercial establishments, and fish and wildlife management areas. It also contains detailed historic annual pumpage information for wells and surface water intakes from 1978 on, an example of which can be seen in Figure 1.

For the 2012 reporting year, data were primarily collected using paper questionnaires sent out early in the calendar year.

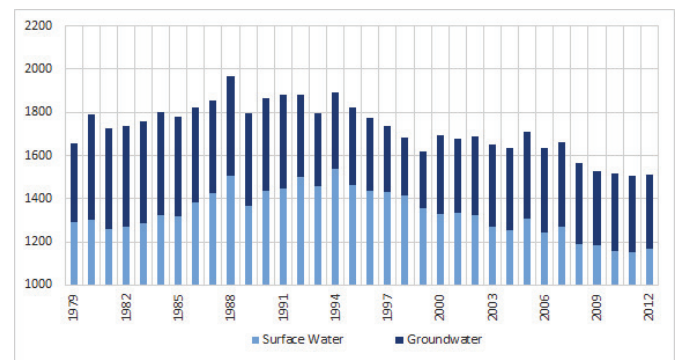


Figure 1. Public water supply withdrawals (mgd) by withdrawal type (1978-2012).

Forms were then filled out and returned by mail to the State Water Survey. Typically a second mailing is required, along with phone inquiries to specific facilities to ensure a high return rate.

Water withdrawals for agricultural irrigation systems are not included in this fact sheet. These facilities have not been required to submit withdrawal information to date. The 2010 amendment to the Water Use Act of 1983 requires reporting of agricultural irrigation withdrawals starting in 2015; however, these withdrawals may be estimated using approved ISWS methods if withdrawals are not metered. The ISWS is currently developing estimation techniques for this type of reporting with funding from the Illinois Department of Natural Resources (IDNR). With continued funding from IDNR, the IWIP program is moving toward and is on track to become a completely digital reporting system by the end of 2015.

Water Withdrawals

Terminology. The term “water use” refers to the amount of water withdrawn or diverted from a source. If water is returned to its original source, then the portion returned is considered a non-consumptive use. If water is returned to a stream, lake, aquifer, or other source other than the source it came from, the use is considered consumptive use. In the case of non-consumptive use, the water can be withdrawn anew and the summation of successive withdrawals provides a total cumulative withdrawal or use for reporting purposes.

A “public water supply” provides water for human consumption to at least 15 service connections or regularly serves an average of at least 25 people at least 60 days per year. IWIP

has historically gathered withdrawal data from community water supplies that provide water to the same population on a yearly basis.

Facilities using their own groundwater or surface water source are categorized as “self-supplied,” meaning they do not purchase their water from another entity.

Water used to generate hydroelectric power is also included as a withdrawal use in this fact sheet because of its diversion through power plants. Power generation use is categorized within the self-supplied industry totals, and because of the tremendous amount of water being diverted, some of the tables and figures in this fact sheet are provided without power generation use included.

Water withdrawal data are reported as average daily quantities usually derived from the annual use. This use is expressed in million gallons per day (mgd).

Public Water Supplies. Illinois public water systems greatly vary in size and attributes, from the city of Chicago, the largest public water supplier in Illinois, to small rural water suppliers across the state. Overall, public water systems in the state withdrew a combined total of 1,509 mgd for the 2012 year. During the 2012 reporting year 2,279 point sources classified as public water supply point sources reported to IWIP. Of those 2,279 point sources, 2,180 wells, or about 95%, withdrew water from a groundwater source. These withdrawals are shown in Figure 2. The other 99 intakes, or about 5%, withdrew from a surface water source. These withdrawals are shown in Figure 3.

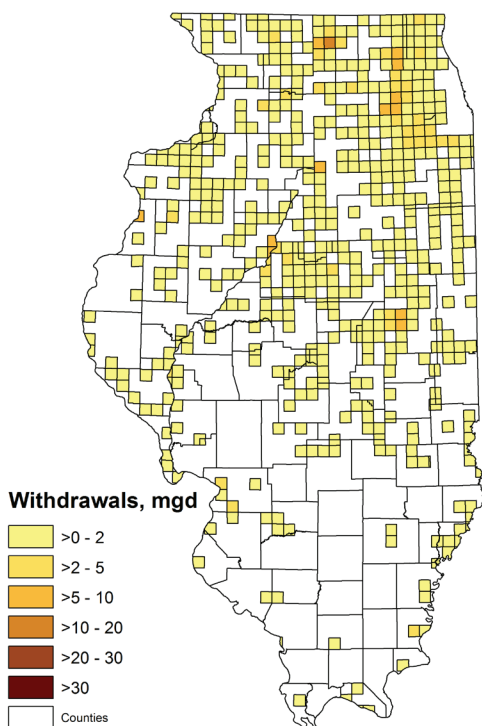


Figure 2. Groundwater withdrawals by public water systems, by township (2012).

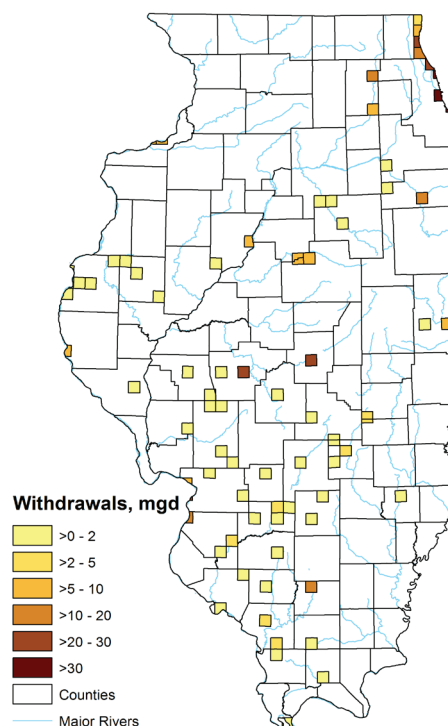


Figure 3. Surface water withdrawals by public water systems, by township (2012).

Self-Supplied Industry. A variety of commercial entities as well as industrial facilities contributed to the 38,721 mgd withdrawn by self-supplied industrial sources in 2012. IWIP recorded 871 point sources classified as self-supplied industry reporting for the 2012 year. Of those point sources, 759, or about 87%, withdrew water from groundwater sources (Figure 4). The remaining 112 intakes, or 13%, withdrew water from surface water sources (Figure 5).

It is important to note that the above numbers include withdrawals from power generation facilities. However, out of the 38,721 mgd withdrawn by self-supplied industrial facilities in 2012, about 99% of those withdrawals can be attributed to power generation facilities, which are discussed in the next section.

Power Generation in Illinois. Hydroelectric and thermoelectric power generation facilities make up the vast majority of water withdrawals in Illinois. Withdrawals attributed to power generation facilities totaled 38,244. The vast majority of this water is returned to its source, typically with an increase in temperature. This is considered non-consumptive use. There is some evaporative loss even in the non-consumptive use category; however, the details of these processes are not included in this summary.

Self-Supplied Industry Excluding Power Generation. Without including power generation facilities' withdrawals, 477 mgd were withdrawn by self-supplied industrial facilities in 2012. About 28%, or 134 mgd, were withdrawn from groundwater sources. The remaining 343 mgd, about 72%, were withdrawn from surface water sources. Figures 6 and 7 show withdrawals from self-supplied industrial facilities, excluding

withdrawals from power generation facilities. Figures 8 and 9 depict all withdrawals at the county and township level from every sector, excluding power generation.

Reporting and Data Quality Assurance. The Water Use Act of 1983 (Illinois Public Act 096-0222) makes the submission of all public water supplies and self-supplied industrial and commercial wells and intakes classified as high capacity to IWIP mandatory. However, despite the best efforts of the program's staff, not every well that is required to be reported will be. This year saw fewer total wells and intakes reported than in 2011, most likely caused by numerous staff changes both in IWIP as well as across the state. Ultimately, this lowered the total pumpage recorded by IWIP in 2012. However, looking at the year's data in a historical context (Figure 1), the recorded data are consistent with historical trends across the state. A more detailed dataset can be found at IWIP's webpage: <http://isws.illinois.edu/gws/iwip/>.

Acknowledgments

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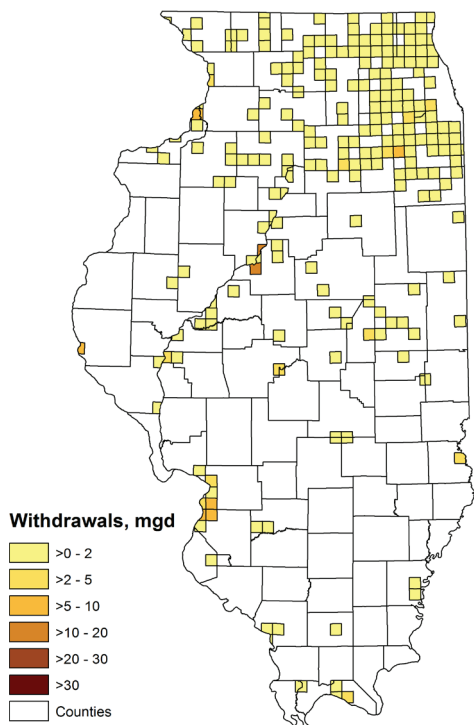


Figure 4. Groundwater withdrawals by self-supplied industrial facilities, including withdrawals for power generation, by township (2012).

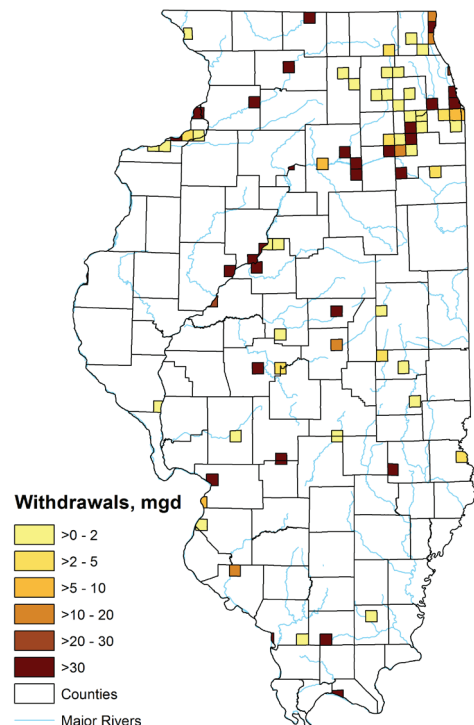


Figure 5. Surface water withdrawals by self-supplied industrial facilities, including withdrawals for power generation, by township (2012).

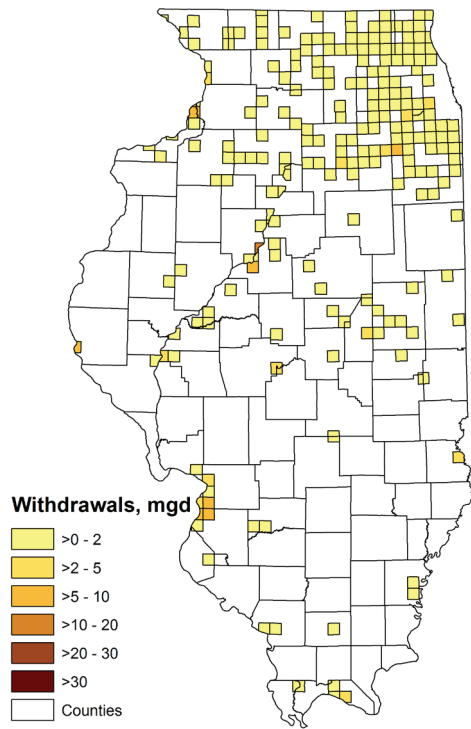


Figure 6. Groundwater withdrawals by self-supplied industrial facilities, excluding withdrawals for power generation, by township (2012).

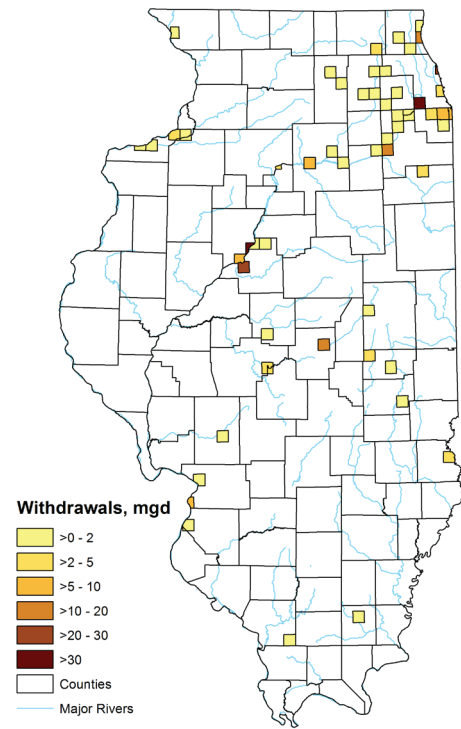


Figure 7. Surface water withdrawals by self-supplied industrial facilities, excluding withdrawals for power generation, by township (2012).

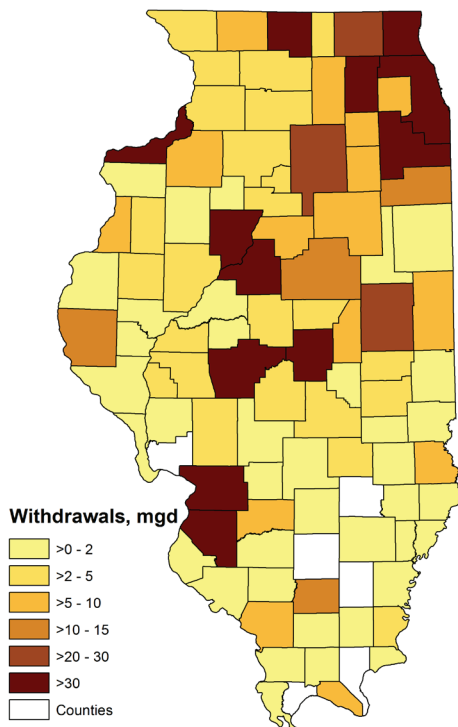


Figure 8. Total withdrawals, excluding withdrawals for power generation, by county (2012).

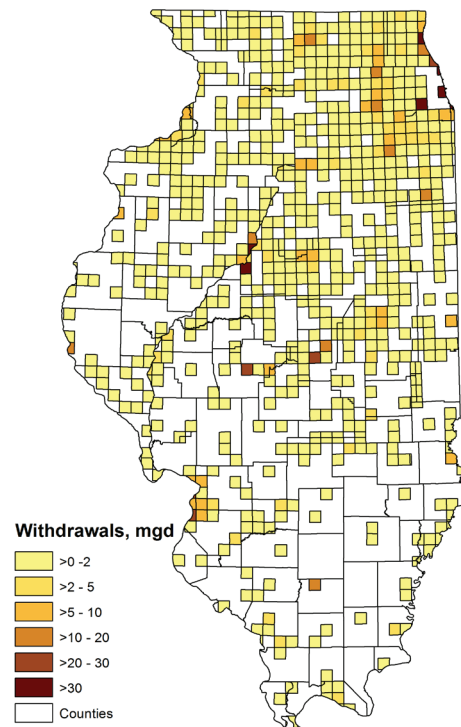


Figure 9. Total withdrawals, excluding withdrawals for power generation, by township (2012).